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ABSTRACT

The Response to Educational Needs Project (RENP) is a compensatory education program being carried out in Washington, D.C. This document consists primarily of statistical and program description data on the effects of RENP in the District of Columbia Public Schools (DCPS). The data include: (1) a summary of RENP costs; (2) statistical information on the effectiveness of RENP and non RENP programs; (3) a summary of non RENP costs; (4) a description of the cost methodology used in program cost effectiveness evaluation; and (5) information on sample and data collection. (GC)

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Technical Appendices Supporting

RMC Report UR 330

IS RENP A COST-EFFECTIVE SUPPLEMENT TO THE DCPS PROGRAM

Michael T. Errecart

February 1978

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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APPENDIX A

SUMMARY OF RENP COSTS

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Table A-1

SUMMARY OF RENP COSTS

Category	Percent of Total	Reading (dollars)	Mathematics (dollars)	Parent/ Community Involvement (dollars)	General Management (dollars)	Total (dollars)	Refer to
Administration							
DCPS	6	--	--	--	112,419	112,419	Budget
RENP	24	71,712	69,638	123,416	209,984	474,750	Table A-2
Laboratories	56	535,240	533,950	--	--	1,069,190	Table A-3
Organizers	7	--	--	133,960	--	133,960	Table A-4
Subtotal		606,952	603,588	257,376	322,403	1,790,390	
Laboratory Space	7	65,430	65,430	--	--	130,860	Table A-2
Total	100	672,382	669,018	257,376	322,403	1,921,179	

Table A-2

RENP ADMINISTRATIVE COSTS
(dollars)

Cost Category	Management	Reading	Mathematics	Parent/ Community Involvement	Total	Percent of Total	Source
Administrative Personnel	191,716	60,799	60,799	114,417	427,731	89.5	Table A-5
Facilities--Rent	5,960	5,960	5,960	5,960	23,840	4.9	RENP Budget
Travel							
Local	1,108	276	138	0	1,522	1.4	Instruments
Out-of-town	923	1,430	0	700	3,053	.5	Instruments
Office Equipment	2,139	2,139	2,139	2,139	8,556	1.8	Table A-6
Office Supplies and Materials	2,769	923	502	0	4,194	.9	RENP Budget
Consultants	5,000	0	0	0	5,000	.9	RENP Budget
Training	369	185	100	200	854	.1	RENP Budget
Total	209,984	71,712	69,638	123,416	474,750		

Table A-3

LABORATORY COSTS[3]

	Cost per Laboratory (dollars)	
	Reading[1]	Mathematics[2]
Personnel		
Facilitator	23,843	23,843
Aides	29,193	29,193
Consultants	220	150
Subtotal	53,256	53,186
Facilities	6,543	6,543
Equipment	44	84
Materials and Supplies	99	100
Miscellaneous	125	25
Total	60,067	59,938

1. There are ten reading laboratories.
2. There are ten mathematics laboratories.
3. From data collection instruments, direct costs.

Table A-4[1]

COMMUNITY ORGANIZER COSTS

	Cost per Laboratory[2] (dollars)
Personnel	
Community Organizers	5,345
Consultants	75
Janitorial (budget)	510
Student Programs	450
Facilities	0
Equipment	0
Materials and Supplies (budget)	25
Travel and Training	293
Total	6,698

1. From data collection instruments.
2. There are 20 laboratories in total. The cost per organizer is exactly twice the amounts shown.

Table A-5

RENP HEADQUARTERS SALARIES ANALYSIS

FTE	Job	Grade	Salary[1] (Loaded)	Allocation: Reading	Math	Parent/ Community	Management
1	Director	TSA 5	$ 30,173				$ 30,173
1	Assistant Director--Reading	TSA 8	25,354	$ 25,354			
1	Assistant Director--Math	TSA 8	25,354		$ 25,354		
1	Assistant Director--PCI	GS-12	24,578			$ 24,578	
1	Resource Coordinator	GS-11	20,607				20,607
1	Public Information	GS-11	20,607				20,607
1	Research and Evaluation	TSA10	23,843				23,843
1	Assistant Director--Management	GS-12	24,578				24,578
1	Account Clerk	GS-7	14,437				14,437
1	Administrative Assistant--personnel	GS-7	14,437				14,437
1	Secretary to Director	GS-6	13,532				13,532
1	Office Services--Supervisor	GS-5	11,602				11,602
1	Receptionist	GS-3	8,950				8,950
1	Machine Operator	GS-3	8,950				8,950
2	Community Relations Specialists	GS-5	23,204			23,204	
1	Program Assistant--Reading	TSA10	23,843	23,843			
1	Program Assistant--Math	TSA10	23,843		23,843		
1	Secretary--Reading	GS-5	11,602	11,602			
1	Secretary--Math	GS-5	11,602		11,602		
1	Secretary--PCI	GS-5	11,602			11,602	
1	Administrative Assistant-PCI	GS-6	13,532			13,532	
1	Program Assistant--PCI	GS-7	14,437			14,437	
2	Senior Community Organizers	GS-6	27,064			27,064	
TOTALS			$ 427,733	$ 60,799	$ 60,799	$ 114,417	$ 191,735

1. FY1977 Salary Tables--Regular Budget Average Salaries for all regular budget, impact aid, and indirect cost positions based on 2-76 payroll data, Budget Division, April, 1976.

Table A-6

RENP HEADQUARTERS OFFICE EQUIPMENT COSTS

	Price	Quantity	Amount	Life (years)	Annualized investment at 7 percent	Maintenance Charge	Maintenance Cost	Annualized Cost
IBM Selectrics	$ 900	14	$ 12,600	10	$ 1,789.20	5%	$ 630.00	$ 2,419.20
Stencil Copiers	1,075	2	2,150	10	305.30	5%	107.50	412.80
Burners	500	2	1,000	5	244.00	5%	50.00	294.00
Collator (manual)	35	1	35	5	8.54	0	0	8.54
Folder	490	1	490	5	119.56	5%	24.50	144.06
Platemaker for Offset	500	1	500	5	122.00	5%	25.00	147.00
Offset	2,935	1	2,935	10	416.77	5%	146.80	563.57
Calculators (Monroe)	300	5	300	5	73.20	5%	15.00	88.20
Royal Typewriters	440	2	440	20	62.48	5%	22.00	84.48
Laminating Film Machine	800	1	800	10	113.60	5%	40.00	153.60
Viewlex	27	3	81	10	11.50	5%	4.05	15.55
Dolly	50	1	50	10	7.10	0	0	7.10
Papercutter	38	1	38	20	3.57	0	0	3.57
Movie Screen	100	1	100	10	14.20	0	0	14.20
Ditto (motorized)	615	1	815	10	87.33	5%	30.75	118.08
Professional Desks	250	27	6,210	20	583.74	0	0	583.74
Professional Chairs	55	27	1,485	20	139.59	0	0	139.59
File Cabinets	100	19	1,900	15	209.00	0	0	209.00
Bookcases	76	7	532	20	50.08	0	0	50.08
Storage Cabinets	110	2	220	20	20.68	0	0	20.68
Rental for Office Copier								3,240.00
Total Equipment Costs								$ 8,559.30

Table A-7

ALLOCATION OF INDIRECT RESOURCES TO FUNCTIONAL UNITS

Functional Component	Component Management	General Administration		Total Indirect Charges	Unit Cost
		DCPS	RENP		
Reading Labs (10)	71,712	37,473	69,994	179,179	17,918
Mathematics Labs (10)	69,638	37,473	69,995	177,106	17,711
P/CI Organizers (10)	123,416	37,473	69,995	230,884	23,088
Total	264,766	112,419	209,984	587,169	

Table A-8

ALLOCATION OF TOTAL FUNCTIONAL COMPONENT RESOURCES TO FUNCTIONAL OBJECTIVES
TOTAL COSTS PER UNIT BASIS

Functional Component	Cost/Unit			Functional Objective[1]		
	Direct	Indirect	Total	Teacher Training	Student Instruction	Organization
Reading Labs	60,067	17,918	77,985	36,183	41,802	--
Mathematics Labs	59,938	17,711	77,649	36,044	41,605	--
P/CI Organizers	13,396	23,088	36,484	--	--	36,484

1. Aides are assumed to devote 100% of their time to student instruction and program facilitators 100% to teacher training; 50% of facilities and consultant costs are allocated to each objective. The remaining categories are allocated to student instruction. These consist primarily of materials, supplies, and equipment.

Table A-9

TOTAL COSTS BY OBJECTIVE ON A PER STUDENT BASIS

Unit	Cost Per Student				
	Average Number of Students	Teacher Training	Student Instruction	P/CI	Total
Reading Labs	293.1	123	143	--	266
Mathematics Labs	318.2	113	131	--	244
P/CI Organizer	611.3	--	--	60	60

Table A-10

TOTAL COSTS BY OBJECTIVE ON A PER CLASS BASIS

Unit	Cost Per Class				
	Average Number of Students	Teacher Training	Student Instruction	P/CI	Total
Reading Labs	11.0	3,289	3,800	--	7,089
Mathematics Labs	12.1	2,979	3,438	--	6,417
P/CI Organizer	23.1	--	--	--	1,579

Table A-11

TOTAL COSTS BY LEVEL OF SERVICE:
PER CLASS AND PER STUDENT BASES

Total Cost for Each Class Served By:	Cost Per Class	Cost Per Student
Reading Labs, ½ P/CI Organizer	8,668	326
Mathematics Labs, ½ P/CI Organizer	7,996	304
Reading and Mathematics Labs, One P/CI Organizer	16,664	630

Table A-12

RESOURCE BREAKOUT OF PWNP COSTS

Category	Cost (dollars)
Personnel	
Professional Staff	1,595,351
Consultants	10,200
Other	19,200
Subtotal	1,628,391
Facilities	154,700
Equipment	9,784
Materials and Supplies	6,784
Travel and Training	12,739
OCPS	112,419
Total	1,921,179

APPENDIX B

EFFECTIVENESS DATA

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Means and Standard Deviations for Fall 1976 Pretest, Spring 1977 Post-Test and Fall 1977 Post-Test Raw Scores by Grade for RENP, Non-RENP, and Total Samples

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Table B-2. CTBS Math Total Score

Table B-3. CTBS Gains-Reading Total Score

Table B-4. CTBS Gains-Math Total Score

Table B-5. Grades 4 and 5 CTBS Reading Total Score

Table B-6. Grades 6 and 8 CTBS Reading Total Score

Table B-7. Grades 4 and 5 CTBS Math Total Score

Table B-8. Grades 6 and 8 CTBS Math Total Score

General Description of ANOVA Model

Table B-9. ANOVA on Reading Scores

Table B-10. ANOVA on Mathematics Scores

Table B-1. CTBS Reading TOTAL SCORE: Fall 1976 Pretest, Spring 1977 Posttest and Fall 1977 Posttest Raw Scores by Grade for RENP, NON-RENP and Total Samples.

	N*	Fall 1976 Pretest Scores				Spring 1977 Posttest Scores				Fall 1977 Posttest Scores			
		M	SD	L.C.%**	G.E.***	M	SD	L.C.%**	G.E.***	M	SD	L.C.%**	G.E.***
4th Grade													
RENP	70	37	16.0	38	3.6	48	15.3	39	4.1	51	17.[illegible]	41	
NON-RENP	73	43	19.3	47	4.0	51	18.3	43	4.3	54	19.[illegible]	44	
TOTAL	143	40	17.9	43	3.8	50	16.9	42	4.3	53	18.3	43	
5th Grade													
RENP	78	30	13.1	34	4.1	47	15.7	55	6.1	42	15.4	44	
NON-RENP	30	30	12.7	34	4.1	41	15.4	41	5.3	37	17.3	35	
TOTAL	108	30	12.9	34	4.1	45	15.8	50	5.7	41	16.0	43	
6th Grade													
RENP	46	36	15.7	33	5.0	45	14.3	41	5.7	46	14.7	42	
NON-RENP	18	44	18.6	48	5.9	49	19.5	48	6.4	54	18.7	52	
TOTAL	64	39	16.8	39	5.4	46	15.9	42	5.9	48	16.1	44	
8th Grade													
RENP	99	35	14.6	37	6.9	39	14.8	36	7.5	44	15.0	42	
NON-RENP	-	-	-	-	-	-	-	-	-	-	-	-	
TOTAL	99	35	14.6	37	6.9	39	14.8	36	7.5	44	15.0	42	

* Number of students across all classrooms.

** Percentile rankings for large city norms. These represent the percentile ranking which a student would obtain if that student's raw score were equal to the student mean.

*** Grade point equivalents of the student mean. This represents the grade point equivalent which a student would obtain if that student's raw score were equal to the student mean.

Table B-2. CTBS Math Total Score: Fall 1976 Pretest, Spring 1977 Posttest and Fall 1977 Posttest Raw Scores by Grade for RENP, NON-RENP and Total Samples.

	N*	Fall 1976 Pretest Scores				Spring 1977 Posttest Scores				Fall 1977 Posttest Scores			
		M	SD	L.C.%**	G.E.***	M	SD	L.C.%**	G.E.***	M	SD	L.C.%**	G.E.***
4th Grade													
RENP	63	55	16.3	38	3.6	64	19.4	47	4.5	73	18.1	39	
NON-RENP	62	60	20.1	45	3.9	71	17.8	56	4.9	76	18.5	42	
TOTAL	125	58	18.4	42	3.8	67	18.8	50	4.7	75	18.3	41	
5th Grade													
RENP	63	41	12.5	39	4.6	53	16.6	51	5.8	50	17.1	39	
NON-RENP	28	41	10.7	39	4.6	52	14.5	50	5.7	58	15.6	52	
TOTAL	91	41	11.9	39	4.6	52	15.9	50	5.7	52	17.0	42	
6th Grade													
RENP	37	50	14.4	39	5.5	66	15.9	58	7.2	60	16.5	42	
NON-RENP	10	48	13.7	36	5.3	58	13.9	47	6.4	62	16.0	44	
TOTAL	47	49	14.1	37	5.4	65	15.7	57	7.1	60	16.2	42	
8th Grade													
RENP	78	38	13.1	35	6.9	42	13.0	40	7.9	49	17.4	42	
NON-RENP	-	-	-	-	-	-	-	-	-	-	-	-	
TOTAL	78	38	13.1	35	6.9	42	13.0	40	7.9	49	17.4	42	

* Number of students across all classrooms.

** Percentile rankings for large city norms. These represent the percentile ranking which a student would obtain if that student's raw score were equal to the student mean.

*** Grade point equivalents of the student mean. This represents the grade point equivalent which a student would obtain if that student's raw score were equal to the student mean.

Table B-3

CTBS GAINS-READING TOTAL SCORE

	n	Fall 1976 - Spring 1977		Spring 1976 - Fall 1977		Fall 1976 - Fall 1977		$/Pt.
		Gain[1]	Standard Deviation[1]	Gain[1]	Standard Deviation[1]	Gain[1]	Standard Deviation[1]	
4th								
RENP	70	11	2.6	3	2.6	14	2.8	$112
Non-RENP	73	8	3.1	3	3.1	11	3.3	108
5th								
RENP	78	17	2.3	-5	2.5	12	2.3	132
Non-RENP	30	11	3.7	-4	4.2	7	3.9	109
6th								
RENP	46	9	3.1	1	3.0	10	3.2	156
Non-RENP	18	5	6.4	5	6.4	10	6.2	119
8th								
RENP	99	4	2.1	5	2.1	9	2.1	
Non-RENP	--	--	--	--	--	--	--	

. "Gain" is calculated as "mean post-test - mean pretest." "Standard deviation" is calculated as

$$\{[(\text{S.D. Pretest})^2 + (\text{S.D. Post-test})^2]/(\#\text{ of Students})\}^{\frac{1}{2}} .$$

The data provided did not allow for the calculation of covariances. Consequently, the estimates provided are likely to be substantial overestimates of the true standard deviations. Note that the statistic is the standard deviation of the mean gain.

Table B-4

CTBS GAINS-MATH TOTAL SCORE

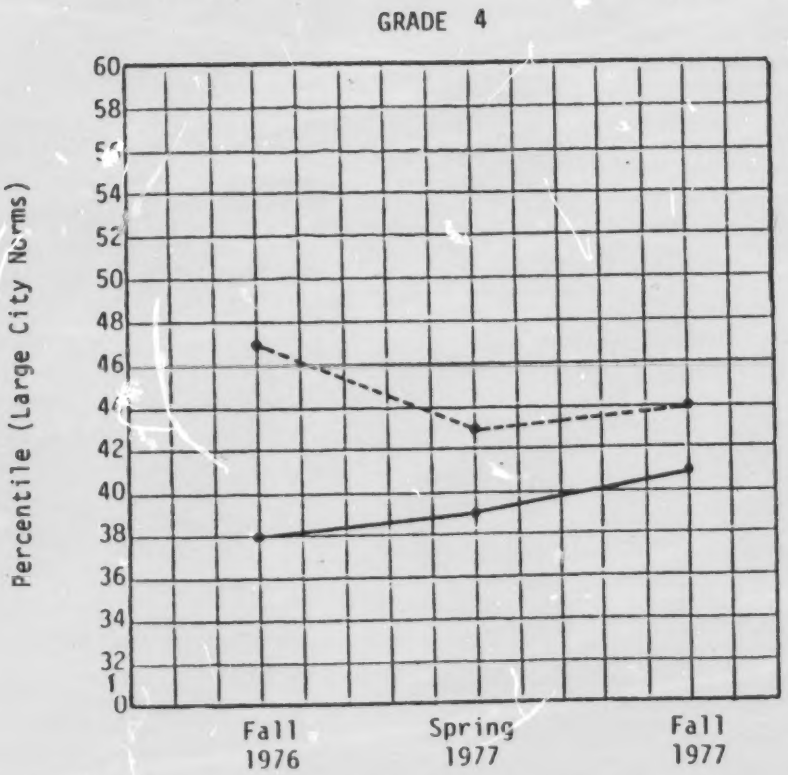
	n	Fall 1976 - Spring 1977		Spring 1976 - Fall 1977		Fall 1976 - Fall 1977		$/Pt.
		Gain[1]	Standard Deviation[1]	Gain[1]	Standard Deviation[1]	Gain[1]	Standard Deviation[1]	
4th								
RENP	63	9	3.2	9	3.3	18	3.1	$ 85
Non-RENP	62	11	3.4	5	3.3	16	3.5	75
5th								
RENP	63	12	2.6	-3	3.0	9	2.7	171
Non-RENP	29	11	3.4	6	3.5	17	3.6	69
6th								
RENP	37	16	3.5	-6	3.8	10	3.6	154
Non-RENP	10	10	6.2	4	6.7	14	6.7	85
8th								
RENP	78	4	2.1	7	2.5	11	2.5	
Non-RENP	--	--	--	--	--	--	--	

[1] "Gain" is calculated as "mean post-test - mean pretest." "Standard deviation" is calculated as

$$\{[(\text{S.D. Pretest})^2 + (\text{S.D. Post-test})^2]/(\#\text{ of Cases})\}^{\frac{1}{2}} .$$

The data provided did not allow for the calculation of covariances; consequently, the estimates provided can be expected to be overestimates (possibly large overestimates). Note that the statistic is the standard deviation of the mean gain.

Legend: ——— RENP -------- NON-RENP



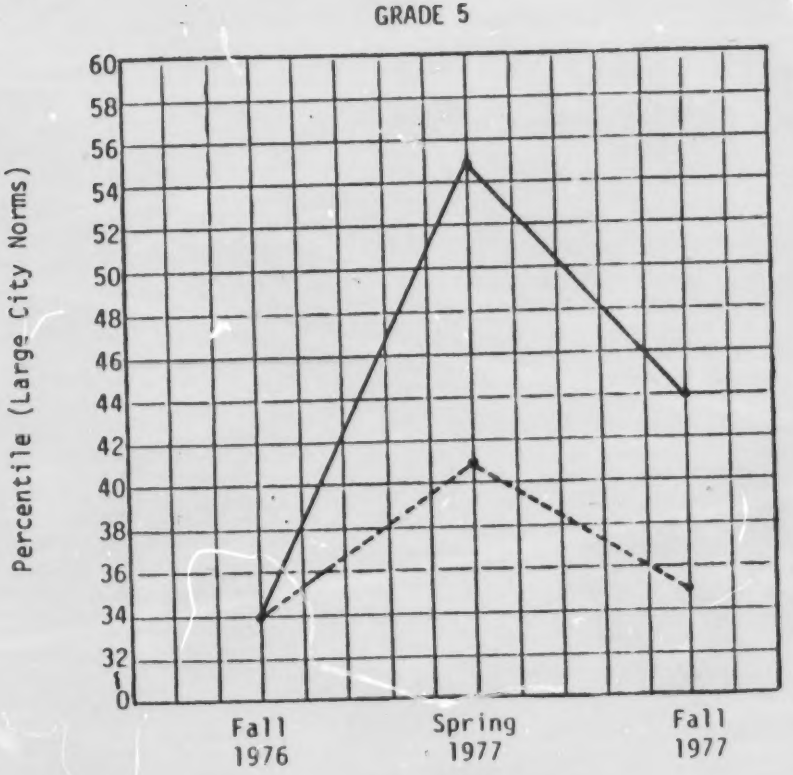
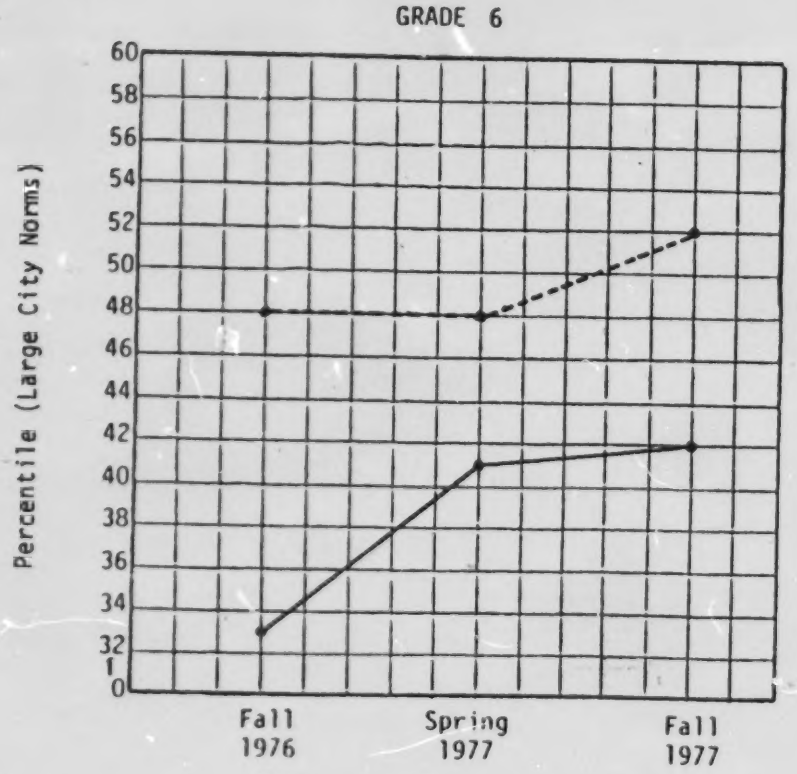


Table B-5. CTBS READING TOTAL SCORE: Mean Percentile Rank Relative to Large City Norms.

Legend: ——— RENP -------- NON-RENP



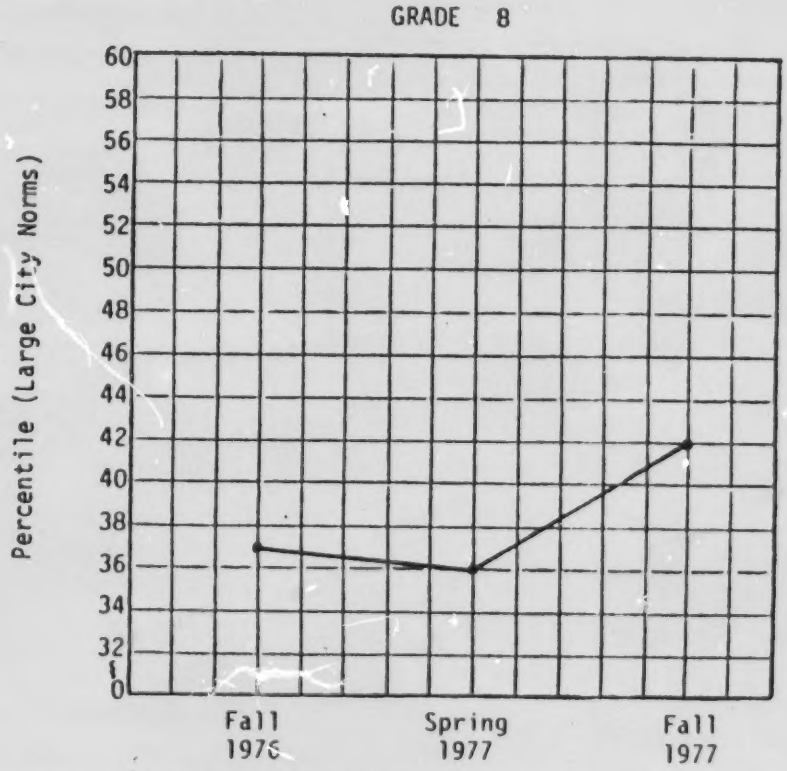
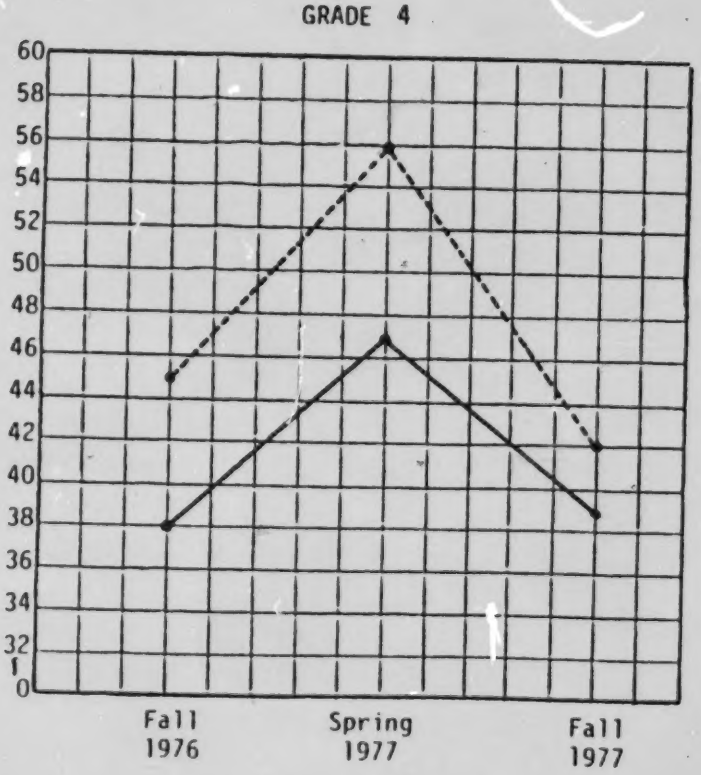


Table B-6. CTBS READING TOTAL SCORE: Mean Percentile Rank Relative to Large City Norms.

Legend: ——— RENP -------- NON-RENP



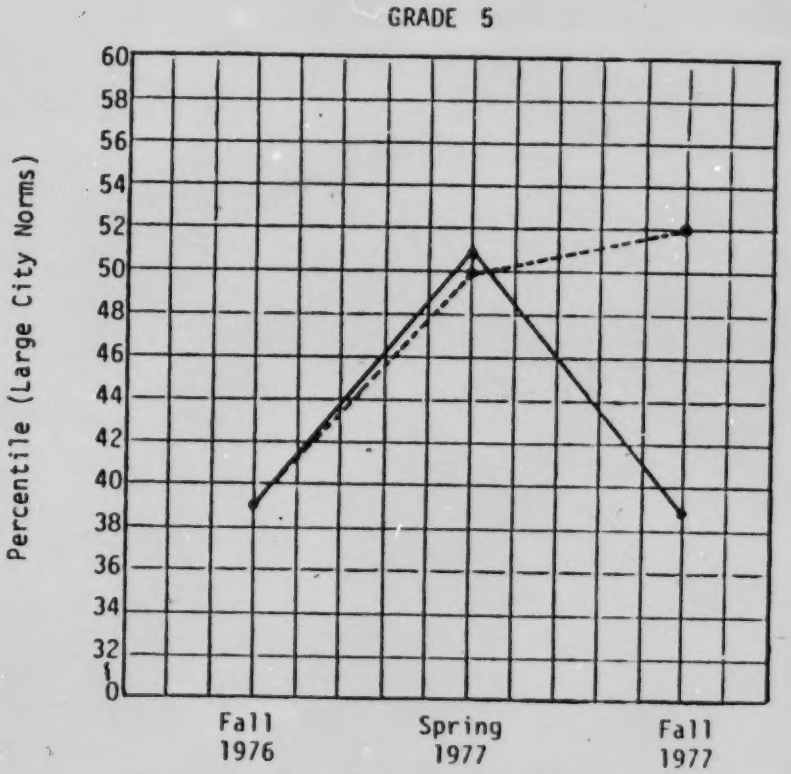
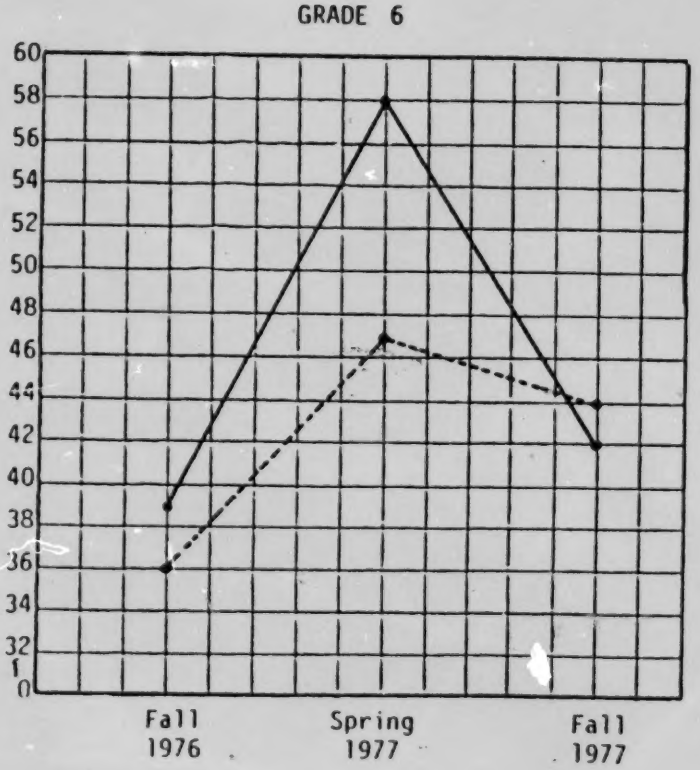


Table B-7. CTBS MATH TOTAL SCORE: Mean Percentile Rank Relative to Large City Norms.

Legend: ——— RENP -------- NON-RENP



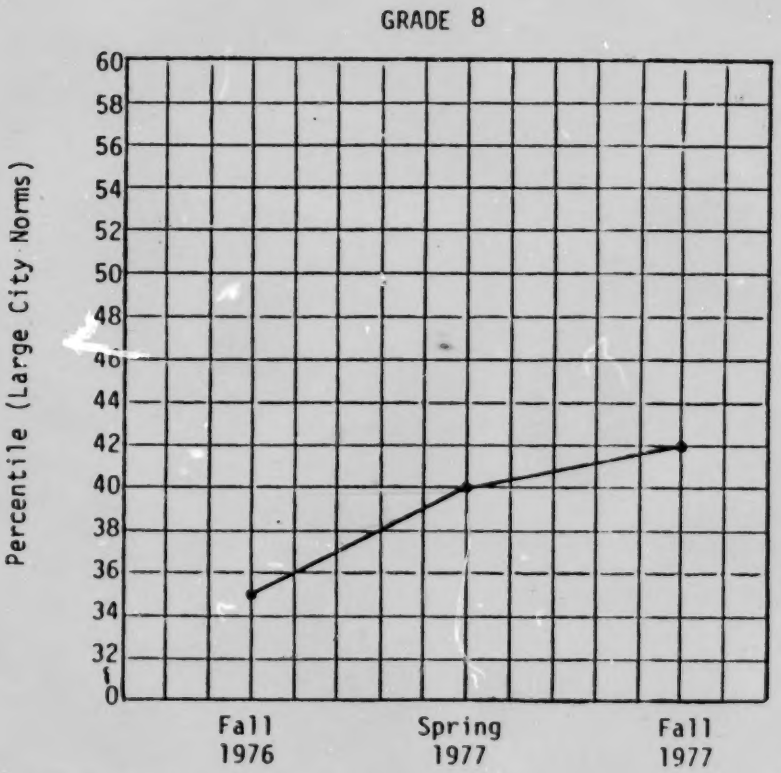


Table B-8. CTBS MATH TOTAL SCORE: Mean Percentile Rank Relative to Large City Norms.

General Description of Analytical Model

Preliminary analyses indicated that there is a gap between Washington, D. C. and large city norms (Appendix B). Thus a gain score analysis was used to enable us to answer the question, "Is the achievement gap between Washington, D. C. and large cities being narrowed for the RENP and/or the NON-RENP groups?"

The raw gain score is a modification of the Standardized Growth Expectation (SGE), a concept developed by Jack Stenner of the National Testing Service. To account for varying "rates of growth", Stenner suggest the Standardized Growth Expectation. He states:

> "The difference between the pretest percentile and the posttest percentile expressed in standard score form is referenced as the Standardized Growth Expectation (SGE)."

Based on Stenner's concept, the raw gain score was defined as the posttest raw score minus the expected posttest raw score.

Posttest Raw Score	Minus	Expected Posttest Raw Score	Equals	Raw Gain Score

The expected posttest raw score is that raw score which a student must obtain on the posttest in order to maintain his/her pretest percentile rank relative to the normative group and is obtained by:

1. Using pretest norms (ex. 4.1 norms for 4th grade month one for fall 1976 pretest), determine the student's percentile rank (30%).

2. Using the pretest percentile rank (30%) enter the posttest norms (ex. 4.7 norms for 4th grade, month seven for the spring 1977 posttest) and determine the equivalent raw score. This posttest raw score is the expected posttest raw score for this individual.

3. Any number of raw gain score points over or under that expected is the adjusted raw gain score.

An analysis of variance model using the raw gain score as the dependent variable was used. In the analysis of variance is a treatment (RENP/NON-RENP) by grade (4th, 5th and 6th), by class nested within grade by three achievement level design. The unit of analysis is the classroom, which meets the requirement of independence of observation for the analysis of variance model.

One of the concerns in evaluating the RENP project was that effects, if present, might not be uniform across all children. It was possible, therefore, that tests of simple main effects would overlook important program by type of student interactions. As one step against such a possibility, a split-plot design was used which left level of past school achievement (high, medium, and low) crossed with the RENP to NON-RENP comparison. While splitting each class into three groups of students was motivated by a concern for estimating interactions, it also contributed toward the solution of another problem in the evaluation, i.e., correcting for its quasi-experimental nature. The correction for nonrandom assignment results from each classroom getting equal weight for the mean of its students in each category of past achievement rather than weights equal to the number of students falling in the category. Thus, each classroom tends to look like each other classroom on the pretest, but not exactly because of the crudeness of the blocking (only three categories). To the extent that pretest and posttest are correlated, this "equating" on the pretest will control for confounding in the posttest.

This type of analysis enabled us to examine the effectiveness of RENP compared with the NON-RENP across grade by achievement level and within grade by achievement level.

Table B-7

CTBS READING SCORES: Summary of Output From Split-plot Analysis of Variance Using Raw Gain Scores** (from Fall 1976 to Spring 1977) as the Dependent Variable Including Grades 4, 5, and 6***

	Source of Variation	DF	F-ratios VOCABULARY	COMPREHENSION	TOTAL
Main Effect	Treatment (TR)	1	.56	3.79*	
	Achievement Level (ACH)	2	21.50*	3.34*	
	Grade (GR)	2	5.26*	1.84	(RESULTS
2-Way Interactions					
	TR X ACH	2	3.56*	.21	
	TR X Grade	2	.52	2.82*	AVAILABLE
	ACH X Grade	4	.97	1.21	
3-Way Interaction					
	TR X ACH X Grade	4	.07	.81	LATER)

*Significant at $p \leq .10$

**Raw Gain Scores are defined as the posttest raw score minus the expected posttest raw score. The expected posttest raw score is that which a student must obtain on the posttest in order to maintain pretest percentile rank. Each student's gain score was obtained and then averaged to obtain classroom means since the unit of analysis is the classroom.

***Grade 8 was to be analyzed separately. Unfortunately Spring posttest data were not available for the NON-REMP group thus the analysis could not be conducted. Means are presented for the 8th grade REMP groups in later tables for comparison purposes.

Table C-8

CTBS MATH SCORES: Summary of Output from Split-plot Analysis of Variance Using Raw Gain Scores** (from Fall 1976 to Spring 1977) as the Dependent Variable Including Grades 4, 5 and 6***

Source of Variation	DF	F-ratios COMPUTATION	CONCEPTS	APPLICATIONS	TOTAL
Main Effect					
Treatment (TR)	1	.56	4.85*	.41	
Achievement Level (ACH)	2	13.98*	13.74*	25.30*	(RESULTS
Grade (GR)	2	.93	.25	3.41*	
2-Way Interactions					
TR X ACH	2	1.74	2.66*	.26	AVAILABLE
TR X Grade	2	1.13	.91	.12	
ACH X Grade	4	.55	.98	1.16	
3-Way Interaction					
TR X ACH X Grade	4	3.08*	.31	1.06	LATER)

* Significant at $p \leq .10$

**Raw Gain Scores are defined as the posttest raw score minus the expected posttest raw score. The expected posttest raw score is that which a student must obtain on the posttest in order to maintain pretest percentile rank. Each student's gain score was obtained and then averaged to obtain classroom means since the unit of analysis is the classroom.

***Grade 8 was to be analyzed separately. Unfortunately Spring posttest data were not available for the NON-REMP group thus the analysis could not be conducted. Means are presented for the 8th grade REMP groups in later tables for comparison purposes.

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APPENDIX C

SUMMARY OF NON-RENP COSTS

CONTENTS

Table C-1. Average Cost Per Class of Non-RENP Resources

Table C-2. Resource Data for All Classes in the Sample

Table C-3. Cost Per Class of Non-RENP School Personnel

Table C-4. School Costs for Books and Supplies

Table C-5. School Equipment Costs

Table C-6. Enrollment in Sample Schools

Table C-1
AVERAGE COSTS PER CLASS, EXCLUDING RENP[a,b]
(dollars)

	Experimental Schools	Control Schools	Significant at .10[c]
Personnel			
Classroom Teachers	16,737 (2,414)	16,494 (2,474)	No
Other Instructional Staff	4,379 (979)	5,013 (1,372)	No
Non-Instructional Staff	1,415 (552)	1,186 (263)	No
Administrative	2,461 (548)	2,297 (300)	No
Facilities	6,543 (0)	6,543 (0)	NA
Textbooks	81 (17)	110 (25)	No
Library Books	95 (42)	95 (32)	No
Supplies and Material	421 (171)	470 (88)	No
Meals	1,716 (616)	1,751 (385)	No
Field Trips	415 (238)	465 (207)	No
Total	34,265 (2,803)	34,424 (2,891)	No

a. Using the school as the unit of observation

b. Standard deviation is in parentheses.

c. Based on t test.

NOTES TO TABLE C-1

Category	Note
Classroom Teacher:	Average is weighted by degrees and years of experience and calculated over sample classes, Table C-2.
Other Personnel Categories:	Average is calculated over sample schools, from Table C-3.
Facilities:	See Cost Methodology section for derivation of cost.
Textbooks:	Average amortized cost of classroom inventories from Table C-2.
Library Books:	Average amortized cost of school inventories from Table C-4.
Supplies and Materials:	Average supplies and materials budgets, Table C-4.
Meals:	Average value of free meals, Table C-2.
Field Trips:	Average value of field trips, Table C-2.

RESOURCE DATA FOR ALL CLASSES IN THE SAMPLE

Schools	ID	Grade/ Classes	Code[1]	Number of Students	Meals		Book			Field Trips	Teacher	
					Breakfast	Lunch	Reading	Math	Other		Experience Years	Education
Birney	1-1	4-1	3	26	26	26	30	35	101	6	33	MA + 15
Congress	2-1	5-1	3	22	10	10	22	22	-	5	9	BA
		5-2	3	21	12	12	20	21	21	1	5	BA + 15
		6-1	3	30	10	10	30	30	-	3	18	MA + N
Draper	3-1	4-1	1	25	18	18	25	25	50	2	10	MA + 12
	-	5-1	1	24	21	21	24	48	24	3	9	BS + 11
Friendship	4-1	6-1	3	24	10	14	0	0	0	3	9	MA + 9
Green	5-1	4-1	2	25	18	18	12	-	4	10	20	MA + 60
		6-1	2	19	12	12	21	21	63	4	19	BA + 15
Hart	6-1	8-1	3	-	-	-	-	-	60	0	9.5	
		8-2	3	-	-	-	-	-	-	-	8	BS + 30
		8-3	3	26	-	-	36	0	99	0	5	BS + 5
		8-4	3	18	-	-	-	18	-	0	15	BS + 45
		8-5	3	-	-	-	-	-	1	1	11	BS
		8-6	3	26	-	-	150	-	-	2	11	BA
Hendley	7-1	5-1	1	30	20	20	30	42	90	1	12	BS + 8
		5-2	1	30	20	20	30	30	150	3	8	BA + 15
Johnson	8-2	8-1	0	-	-	-	-	-	-	-	-	-
		8-2	0	-	-	-	-	-	-	-	-	-
		8-3	0	-	-	-	-	-	-	-	-	-
		8-4	0	-	-	-	-	-	-	-	-	-
		8-5	0	-	-	-	-	-	-	-	-	-
		8-6	0	-	-	-	-	-	-	-	-	-
Ketcham	9-2	4-1	0	33	7	25	35	27	83	5	26	MA + 30
Leckie	10-1	4-1	2	26	10	10	-	41	62	4	26	BS + 14
		4-2	2	25	10	10	0	75	60	4	25	BS + 15
Malcolm X	11-1	5-1	2	32	16	32	24	15	25	9	32	MA
McGogney	12-2	6-1	0	29	15	15	32	33	-	6	10.5	BA
Noten	13-2	4-1	2	28	18	18	88	28	28	4	6	BS + 15
		4-2	2	28	25	25	75	15	68	4	11	BA + 15
		4-3	2	29	21	21	103	38	28	4	4	BA
		5-1	2	28	-	-	94	21	87	6	14	BA + 15
		6-1	2	25	-	-	104	31	95	6	18	BA
		6-2	2	28	-	-	128	30	28	6	21	BA

Table C-2

RESOURCE DATA FOR ALL CLASSES IN THE SAMPLE

(continued)

Patterson	14-2	4-1	0	26	13	9	26	26	75	1	10	BA + 15
Randle Highlands	15-2	4-1	0	-	18	18	16	20	60	5	11	BS + 20
		5-1	0	29	19	19	31	31	-	4	12	BS
		6-1	0	-	4	18	28	25	54	11	8	MA
Savoy	16-1	6-1	2	29	26	26	29	29	58	2	6	MA
Simon	17-1	5-1	3	28	15	15	28	28	61	2	26	BS
		6-1	3	23	6	6	24	24	24	4	7	BS
Stanton	18-2	6-1	0	27	19	19	189	0	0	3	10	MA
Turner	19-2	5-1	0	-	-	-	-	-	-	-	-	-
Washington Highlands	20-2	6-2	0	25	20	20	135	30	72	5	8	MA + 20
			0	24	22	22	26	32	50	6	4	BA + 15

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NOTES:

1. Codes

   0 = Non-RENP
   1 = RENP - Reading Labs
   2 = RENP - Math Labs
   3 = RENP - Both Labs

2. A dash (-) indicates the school did not report this value.

Table C-3

COST PER CLASS FOR NON-RENP SCHOOL PERSONNEL[1]
SAMPLE SCHOOLS

School	Total Classes	Administrative	Non-Instructional	Reading and Math	Other Instructional Support	Total
1-1	34	$ 2,232	$ 513	$ 630	$ 2,558	$ 5,933
2-1	25	2,644	1,073	282	4,865	9,464
3-1	20	2,345	2,178	946	4,150	9,619
4-1	45	2,956	938	392	3,320	7,606
5-1	29.5	2,572	1,275	598	2,950	5,095
6-1	49	3,223	1,079	---	9,663	---
7-1	29	1,676	1,381	1,189	2,045	6,291
8-2	41	2,585	1,159	1,177	4,275	9,196
9-2	30	2,203	829	1,231	1,116	6,009
10-1	25	3,214	1,195	976	3,480	8,865
11-1	36	1,439	2,489	958	3,378	8,264
12-2	24.5	2,115	1,212	1,408	3,551	8,286
13-2	56	1,785	1,374	736	6,187	10,082
14-2	20	2,101	1,244	---	3,484	---
15-2	17	1,884	1,671	---	5,554	---
16-1	24	2,754	1,386	1,766	4,635	10,541
17-1	25	3,037	1,493	2,580	2,095	9,205
18-2	28	1,710	1,283	1,009	3,354	7,356
19-2	33	2,300	822	1,045	3,161	7,328
20-2	37	2,211	1,082	841	5,573	9,707

1. Excludes personnel assigned exclusively to one class.

Table C-4

SCHOOL COSTS FOR BOOKS AND SUPPLIES
FOR SCHOOLS IN THE SAMPLE

School	Classes	Budgeted Textbooks	Budgeted Supplies	Budgeted Periodicals	Library Books	
					Inventory	Current Budget
1-1	34	$ 5,820	$ 8,000	$ 300	$ 2,000	3,300
2-1	25	5,287	6,985	246	1,357	6,550
3-1	20	4,000	6,000	0	0	6,000
4-1	45	---	---	---	---	952
5-1	29.5	6,254	8,500	250	1,300	3,000
6-1	49	---	---	---	---	10,094
7-1	29	8,690	8,000	200	360	4,910
8-2	41	---	7,000	---	---	---
9-2	30	5,068	8,093	350	1,650	1,549
10-1	25	0	4,785	0	920	4,000
11-1	36	3,350	7,000	100	5,700	4,604
12-2	24.5	500	5,500	0	500	---
13-2	56	0	13,000	0	0	1,200
14-2	20	2,074	5,960	1,000	0	5,699
15-2	17	1,000	4,688	80	500	4,650
16-1	24	1,000	8,237	100	1,000	7,292
17-1	25	2,000	7,519	150	1,200	6,805
18-2	28	4,000	7,600	300	700	8,000
19-2	33	1,000	10,000	500	2,500	2,000
20-2	37	5,000	9,000	319	1,000	1,765

Table C-5

SCHOOL EQUIPMENT COSTS
SAMPLE SCHOOLS

School	Total Classes	Equipment Cost			Equipment Cost Per Class
		AV	Office	Total	
1-1	34	$ 4,156	$ 1,717	$ 5,870	$ 173
2-1	25	6,999	2,013	9,012	360
3-1	20	2,919	---	---	---
4-1	45	22,272	---	---	---
5-1	29.5	3,798	3,731	7,529	255
6-1	49	3,284	---	---	---
7-1	29	3,090	1,626	4,716	163
8-2	41	4,314	2,274	6,588	160
9-2	30	2,533	1,073	3,606	120
10-1	25	3,940	1,862	5,802	232
11-1	36	8,172	2,814	10,986	305
12-2	24.5	5,832	1,862	7,694	314
13-2	56	4,816	118	4,933	88
14-2	20	2,333	2,887	5,220	261
15-2	17	3,239	3,000	6,240	367
16-1	24	3,648	2,066	5,714	238
17-1	25	3,332	3,178	6,510	260
18-2	28	4,925	3,265	8,190	293
19-2	33	---	---	---	---
20-2	37	4,311	707	5,018	134

Table C-6

TOTAL ENROLLMENT IN SAMPLE SCHOOLS

School	Total Classes	Total Enrollment	Pupils Per Class
1-1	34	794	23.35
2-1	25	689	27.56
3-1	20	537	26.85
4-1	45	988	21.96
5-1	29.5	854	28.95
6-1	49	1,722	35.14
7-1	29	813	28.03
8-2	41	1,440	35.12
9-2	30	786	26.20
10-1	25	708	28.32
11-1	36	782	21.72
12-2	24.5	694	28.33
13-2	56	1,688	30.14
14-2	20	573	28.65
15-2	17	465	27.35
16-1	24	803	33.46
17-1	25	738	29.52
18-2	28	780	27.86
19-2	33	1,008	30.55
20-2	37	996	26.92

Average class size RENP schools = 27.7

Average class size non-RENP schools = 29.0

APPENDIX D

COST METHODOLOGY/UNIT COSTS

COST METHODOLOGY/UNIT COSTS

THE RESOURCE APPROACH TO COST ANALYSIS

The cost of an educational program can be estimated in several ways. One could, for example, use budget data. Or, one could look at recent operating expenditures and project them to a full year's operations. Or, one could construct a detailed analysis of the resources used in the program, apply prices to the resources, and generate cost estimates based on these quantities and prices. Generally, we have taken the latter approach, although, in some instances, we have relied upon budgetary or expenditure data.

Budgetary data are usually inappropriate for program evaluation. For example, in this study, there were several difficulties with the budgets:

- Because the program was terminating, certain personnel were retained for only 11 months of the budget period, while others were retained for 13. Thus, this budget had to be used with care as it was not based on the assumption on an ongoing program.
- Budgetary data are generally highly aggregated. It is not possible to analyze precisely how line items are affected by differing assumptions as to inflation, vacancy rates, and other factors.
- Budgets do not account for inherited resources. For example, the materials budget for RENP reading was $12,000, while the materials budget for RENP mathematics was only $5,000. Nevertheless, the mathematics laboratories, with inherited resources from purchases in previous years, are better supplied than the reading laboratories.
- Budgetary data are difficult to use when making inter-LEA comparisons because of differences in line-item definition and other accounting practices.

- Certain line items are not intrinsic program costs. For example, a $35,000 item to pay off accrued vacation time would not normally be as high if tight management control over vacation time were exercised and if the program were not terminating.

Budgetary data are useful in certain circumstances, however, In this report, we have used budgetary data in lieu of a resource inventory for items like office supplies, laboratory supplies, travel, and similar items. These resources basically have short, useful lives; there is little problem with inherited resources. In the case of supplies, a great deal of effort would have been required to inventory a myriad of small items and to gather accurate price information. Furthermore, the payoff for this effort is low, since our experience indicates: (1) these inventories are quite unstable, reflecting the effects of batching or orders, late deliveries, uneven use, etc.; and (2) they represent a very small portion of total resource expenditures.

One feature of the resource approach to cost analysis is that it produces a quantified list of the resources used by a program. Not only is the resource list of interest to educators, it is also of particular importance to local decision-makers in contemplating alternative programs.

In this report, D.C. prices were used. Thus, the cost estimates presented in this report are of limited use to other LEA decision-makers when they are investigating the prospective cost impact of RENP on their budgets. Nevertheless, the availability of specific resource information, beyond simple cost estimates, should permit these decision-makers to develop individualized cost estimates. In addition, it allows them to differentiate resources already available to them from those that must be purchased.

Types of Costs Considered

The cost-estimating procedures used in this study were directed toward identifying the total cost of providing education in each school examined. Every effort was made to collect data on all personnel, facilities, equipment, materials, supplies, and services involved in the educational process in the sampled schools. Nevertheless, certain costs that DCPS must pay are only incidentally associated with either RENP or the services provided to children. Two prime examples are the administrative costs of

operating the DCPS (payroll department, bookkeeping, supplies, and materials ordering department, etc.) and the costs of transporting children to and from school. Such activities, although essential for efficient school system operation, are not a direct part of the educational program. Including these costs in our examination would have greatly increased the complexity of data collection without changing the results because both the experimental and control school cost estimates would have been equally affected by these general system-wide costs. Therefore, such costs were excluded from the study; only those resources that directly affected the programs were considered.

Statistics published by NCES[1] indicate that we have excluded between 7 and 10 percent of total costs by this decision. It should be noted that DCPS imposes an explicit 6.7 percent administrative burden on the RENP program, and this cost has been included.

Total Versus Incremental Costs

Education costs can be examined in two ways. The first is referred to as total cost, or the total value of all resources used to operate a program. All resources--regardless of when they were purchased or who paid for them--must be considered. These resources not only include those directly associated with the educational program, but also those that have some impact on a program even though they might be provided to all children in the LEA. All equipment used in the program has some value and should be included even if it was purchased in a previous year for another program. Services provided free of charge because they are either volunteered or paid for by other community agencies are also included.

1. Statistics of State School Systems, 1971-72, National Center for Educational Statistics (NCES 75-153), 1975.

A second type of cost estimate is the incremental cost of the program. The incremental cost considers only the additional program resources that are not normally provided to classrooms. In a sense, the incremental cost measures the special resource requirements of implementing a program. All resources included in the incremental cost are also included in the total cost. Thus, the incremental cost is always less than the total cost of a program.

In evaluating alternative programs, the incremental cost is of most interest because it represents the additional resources required to implement a program. When faced with the decision about whether or not the program should be implemented, the LEA must consider how it will provide those additional resources. If they cannot be provided free (either inherited or volunteered), the LEA must find state or federal funding or increase its own budget to cover the additional cost.

Unit of Analysis

The classroom has been selected as the basic unit of analysis in this study, although sometimes costs will be expressed on a per pupil basis. The classroom was selected for several reasons:

(1) RENP is oriented toward teachers; for the sample drawn, teachers and classrooms are equivalent.

(2) The analysis methods employed in this study were insensitive to variations in the resource levels applied to pupils within the same class. Even if costs were expressed on a per pupil basis, this number would not vary between pupils in the same class. Thus, no information is lost by using a per class measure.

(3) Other studies of compensatory education costs have used the classroom as the unit of analysis.[1,2]

Base-Year Prices

The prices presented in this report represent the best estimates for the 1976 school year. Considering the rapid increase in prices arising from inflation in recent years, these price estimates are not appropriate

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1. D. Rogers, et al., Cost Analysis of Follow Through Projects (Bethesda, Maryland: RMC Research Corporation, 1977).

2. P. Dienemann, et al., An Evaluation of the Cost Effectiveness of Alternative Compensatory Reading Programs (Bethesda, Maryland: RMC Research Corporation, 1974).

for prior years. Likewise, it is reasonable to assume that, if no reduction is made in the quantity of resources employed in RENP, the prices in future years will be higher than those reported here. However, applying inflation factors to the study results should produce reasonably accurate cost estimates in the future.

THE COST MODEL

Resources that support RENP and DCPS programs are available in many places besides the classroom. These resources include RENP administration, school administration, personnel shared by classes, RENP laboratories, etc. To calculate a summary cost per class figure for each class, it is necessary to determine what portion of a resource benefits an individual classroom. The determination of these portions is called an allocation procedure or cost model.

Allocation Procedures

We have structured the allocation rules according to resource type. Resources are either (1) RENP-provided resources, or (2) resources provided from other sources. The following rules are default conditions--that is, they basically describe how we allocated a resource when we could not gather information on its actual allocation. For example, an instructional aide was allocated evenly among the classes served by the laboratory unless unequal support levels were indicated. Although we did not ask each of the several hundred people how they spent their time, we did ask key individuals (component heads, facilitators, principals) who could be expected to know of any special allocations.

RENP Resources

RENP resources can be found at the administrative headquarters, at school-based laboratories, and in the person of community-based organizers. Four administrative activities take place at the administrative headquarters: general management, reading component management, mathematics component management, and parent/community involvement management. General management includes DCPS overhead charges.

> Rule 1: Allocate general management costs equally among the three functional components.

Adding in the prorated general management charges to the component management charges yields the gross management cost for each component.

> Rule 2: Allocate gross component management costs equally among the laboratories (organizers) of the component.

RENP administrative personnel confirmed that this was a reasonable procedure. Each laboratory's (organizer's) share of the component management costs plus the costs directly associated with the laboratory (organizer) yield the total laboratory (organizer) cost. Many of the tables in this report are presented at this level.

> Rule 3: Divide laboratory costs equally among the teachers served by the laboratory.

This yields the cost per class of RENP-provided resources.

Because their clientele includes parents, students, teachers, and the community, it is difficult to tie the work of community organizers to classroom teachers. Nevertheless, it is useful to do so, and a reasonable method is available.

> Rule 4: Divide the total organizer costs between the two laboratories the organizer is associated with, and then among the teachers served by each laboratory.

These four rules allow one to examine costs in a number of ways and at a number of analytical levels.

Other Resources

Other resources can be classified as (1) located in the classroom, (2) shared by classrooms, or (3) shared between classrooms and between schools.

Rule 5: Classroom costs are not allocated.

Rule 6: Resources shared between schools (generally personnel) are allocated in proportion to the amount of time spent in each school.

Rule 7: Resources shared by classes are allocated uniformly among the classes served unless otherwise indicated.

We are not interested in every resource in the schools--only in the resources used by or affecting the sampled classrooms. For example, if we have a fourth-grade classroom in our sample and there is a reading teacher serving only grades 1 to 3, then that teacher is ignored.

Problems with Junior High Schools

Junior high schools present quite difficult cost analysis questions. Unlike the elementary school classes in the sample, the junior high homerooms are together for only one period of the day. The distinction between RENP and non-RENP students is not really meaningful because students from RENP homerooms are taught by non-RENP teachers and vice versa. In addition, from a resource perspective, each student in a homeroom receives a different mix of resources, depending on the student's courses. For example, one student in a homeroom might benefit from the extensive resources of a science laboratory, but another might not.

We have used the number of homerooms in the junior high school as the number of classes in that school. Additionally, we have assumed that each homeroom is taught by one teacher. School personnel remaining after eliminating teachers assigned to homerooms are allocated uniformly among the classes. Audio-visual equipment and office equipment are allocated similarly. Items such as science laboratory equipment, shop equipment, music equipment, and classroom materials are not considered.

These adjustments, although crude, do not severely affect the analysis. The primary result is that (1) we will tend to understate costs at junior highs more than at elementary schools; and (2) we cannot differentiate the cost of classes within a junior high school. Nevertheless, the procedure

introduces no apparent biases into our sample because it affects RENP and control schools equally. Furthermore, these comments do not apply to RENP-provided resources. Both the RENP resource inventory and its target teachers are well-defined in the junior high schools.

Unit Costs

For all elements of the RENP program, costs can be categorized as either:

- capital investments, or
- annual operating expenses.

Capital investments are the one-time expenditures needed to initially implement a program. They include costs for new facilities, equipment, materials, and extraordinary staff training. If a program is totally new, the capital costs might also include one-time expenditures for program design and development of materials.

By contrast, annual operating expenses are the costs incurred each year to operate and maintain a program. They include expenses for salaries, in-service training, materials and supplies, equipment maintenance, facilities operations and maintenance, and other services related to the program. These two broad categories of cost--capital investment and annual operating--are used as the basis for organizing the cost elements.

Treatment of Capital Costs

The primary distinction between capital and operating costs is the length of time benefits are derived from each type of expenditure. Capital resources last many years, while annual expenditures buy resources that are consumed in less than a year. To facilitate making cost comparisons, we need to annualize the capital investment pattern.

The best procedure for making the two costs comparable is to convert the capital investment costs into a series of uniform annual expenditures. Capital costs are amortized over their useful lives by using the following formula:

$$\text{Equivalent Annual Cost} = \text{Resource Price} \times \text{Capital Recovery Factor},$$

where

$$CRF = i(1+i)^n/[(1+i)^n - 1],$$

n = useful life, and

i = discount rate.

The annualized capital costs computed in this manner can be combined with the other annual operating expenses to give total annualized program costs. The advantages of amortized costs, however, must be weighed against the need to estimate useful lives and discount rates.

It must be remembered that there are annual operating cost expenditures associated with capital resources. Examples of these operating expenses include costs of operating facilities, maintenance and repair expenses of facilities and equipment, as well as the purchase of replacements and spare parts.

Facilities

We were unable to gather accurate estimates of the cost per square foot of classroom space in the D.C. Public Schools. For the purposes of this report, we are relying on data gathered by RMC in 1975 on construction costs in the Montgomery County, Maryland, school system. Because the two school jurisdictions are adjacent, it is reasonable to expect that they are faced with approximately the same costs for construction. Thus, the Montgomery County estimates should be applicable to the DCPS.

The Montgomery County school system keeps quite detailed records on the construction and utilities costs for each of its schools. We obtained access to this information and analyzed the construction costs of two newly constructed elementary schools. Construction costs--including architectural fees, site development, and building construction--amounted to $40.55 per square foot. This per-square-foot cost did not include the cost of land or the cost of furniture or equipment included in the builder's fee. These two costs were omitted because the life of land is infinite--it does not depreciate--and because the cost for furniture and equipment is dealt with elsewhere in this report.

An additional aspect of space cost is that not all of the available space is actually used for instructional purposes. Substantial amounts of space are required for storage, toilets, corridors, lobbies, and mechanical equipment. Using the data collected from Montgomery County and our judgment about the amount of direct support space, we estimated that 25

percent of the square footage was used for support purposes. By allocating the cost of this 25 percent over the classroom space, we arrived at a total cost of $54.07 per square foot of classroom space.

Annual operating costs for Montgomery County schools include the cost of utilities, the cost of custodial services, and the costs of security and operations and maintenance. An analysis of 10 elementary schools in Montgomery County showed these costs to be $1.60 per gross square foot. After reallocating support space, we arrived at a figure of $2.46 per square foot for the annual operating costs of facilities space.

We assume that the life of a school is 50 years and the discount rate is 7 percent.

The following prices resulted:

- $54.07 per net square foot for construction costs or capital costs.
- $2.46 per net square foot for annual operating costs.
- $6.38 per net square foot for total annualized costs.

The prices described above are based on 1975 data. Because of inflationary effects, we have inflated these costs by 14 percent, corresponding roughly to increases of 8 percent in 1975 and 6 percent in 1976. The resultant figures are:

- $61.84 per net square foot (capital costs).
- $2.80 per net square foot (operating expenses).
- $7.27 per net square foot (total annualized costs).

Classroom sizes average about 30 feet by 30 feet.[1] And the RENP laboratories are located in dedicated classrooms. Consequently, the space costs for RENP laboratories, experimental, and control classrooms is:

$$\$7.27 \times 900 = \$6,543/\text{room/year}.$$

This analysis applies only to owned facilities. Rented facilities, such as the RENP offices, are costed at the annual rent plus maintenance and utilities.

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1. This was the standard classroom size used in A Cost Analysis of Follow Through Projects.

Furniture and Fixtures

Several methods were used to determine the capital costs of furniture and furnishings. In general, we sought to determine costs that reflected the prices DCPS pays and that were as current as possible.

The first source of price information was an untitled memorandum produced by the DCPS Budget Department that listed actual prices for a large number of furniture, fixtures, and equipment items. If an item was not on that list, several sources were consulted, depending on the nature of the item. The sources included 1977 office supply catalogs from local firms,[1,2] a directory of audio-visual equipment,[3] a three-volume analysis of office systems,[4] and previous RMC studies.[5,6]

Table B-1 displays selected resources, estimated prices, estimated life spans, and annualized costs. A 7 percent discount rate is assumed.

Equipment

Unit prices for equipment items were developed in a manner similar to the one used for developing the unit prices of furniture items. The life, capital investment cost, annual operating cost, and total annualized cost were determined for each equipment item and are displayed in Table B-2. The annual operating costs for equipment items consist primarily of maintenance costs. Maintenance costs for equipment items were assigned based on a percentage of the capital investment costs. Three somewhat arbitrary categories of maintenance requirements were used for analytical convenience. Equipment items requiring no maintenance at all were given an annual operating cost of $0.00; equipment items requiring limited

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1. Ginn's 1977 Office Supply Catalog, Washington, D.C.

2. Delta Office Supplies 1977 Catalog, Gaithersburg, Maryland.

3 The Audio-Visual Directory 1976-1977 (Fairfax, Virginia: National Audio-Visual Association, 1977).

4. N.J. Delran, Office Systems, Vols. I, II, and III.

5. N. Al-Salam, et al., Evaluation of the Field Test of Project Information Packages, Vol. III: Resource Cost Analysis (Bethesda, Maryland: RMC Research Corporation, 1975).

6. A Cost Analysis of Follow Through Projects.

Table D-1

STANDARDIZED COSTS FOR FURNITURE AND FIXTURES

Furniture and Fixtures	Life (years)	Capital Investment Cost (dollars)	Total Annualized Cost (dollars)
REGULAR			
Adult Chair	20	55.00	5.19
Professional Desk	20	230.00	21.62
Student Desk and Chair	10	28.80	4.09
Tables	20	34.00	3.20
Chairs	15	8.00	.88
File Drawers	15	30.89	3.39
Bulletin Board	20	72.91	6.85
Cabinet	20	110.00	10.34
Blackboard	20	65.67	6.17
Typing Stand	10	70.00	9.94
Map Display	10	50.00	7.12
Partition	10	160.00	22.72
Portable Stairs	20	100.00	9.44

Table D-2

ANNUALIZED EQUIPMENT COSTS

Equipment Type	Life (years)	Capital Investment Cost (dollars)	Annual Operating Cost (dollars)	Total Annual Costs (dollars)
OFFICE				
Calculator	5	233.00	11.65	68.50
Coffee Machine	3	40.00	0.00	15.24
Dictaphone	10	400.00	20.00	76.80
Lectern	10	137.00	6.85	26.30
Typewriter: Selectric	10	900.00	45.00	172.80
Royal Electric	10	500.00	25.00	96.00
PRODUCTION OF MATERIALS				
Ditto Machine	5	350.00	17.50	102.90
Duplicating Machine	5	485.00	24.25	142.59
Mimeograph	5	700.00	35.00	205.80
3M Thermofax	10	450.00	22.50	86.40
3M 209 Autocopier	10	2,070.00	103.50	397.44
Transparency Maker	5	400.00	20.00	117.60
Typewriter (primary)	10	275.00	13.75	52.80
Drymount Press	15	211.00	10.50	33.77
Photoflat Weight	20	19.00	0.00	1.79
Paper Cutter	20	17.00	0.00	1.60
SOUND AND SOUND PRODUCTION				
Cassette Player	5	59.00	2.95	17.35
Cassette Player/Recorder	5	85.00	4.25	24.99
Reel to Reel Recorder	10	227.00	34.05	66.48
Record Player	10	62.00	3.10	11.90
Listening Center (10 station)	5	65.00	3.25	19.11
Phono Radio Cassette	5	320.00	16.00	94.08
Stereo Radio	10	80.00	4.00	15.36
Tape/Synch-Mixer	10	68.00	3.40	13.07
Amplifier-Mixer	10	29.00	1.45	5.57
Bulk Tape Eraser	15	14.00	0.00	1.54
VIEWER AND PROJECTION				
Slide Projector	10	87.00	13.05	25.40
Overhead Projector	10	137.00	6.05	26.30
Opaque Projector	10	385.00	19.25	73.92
Filmstrip Projector	10	87.00	4.35	16.70
Filmstrip Viewer	10	27.00	1.35	4.32
Filmloop Projector	5	130.00	6.50	38.22
Movie Screen	10	40.00	0.00	5.68
Microfilm Reader	10	211.00	10.55	40.51
SOUND AND VISUAL				
Cassette/Filmstrip Projector	5	245.00	36.75	96.53
Spellbinder	-	--	0.00	--
Sound/Filmstrip Viewer	5	211.00	31.65	83.13
16MM Projector	10	750.00	37.50	144.00
Television	5	117.00	5.85	34.40
Video Tape Equipment	10	2,900.00	145.00	556.80
PHOTOGRAPHIC				
Camera: Super 8	5	388.00	19.40	114.07
Instamatic	3	40.00	0.00	15.24
Tripod	10	57.00	0.00	8.09
Ektographic Visual Maker	5	125.00	0.00	30.50
SPECIAL READING MACHINES				
Language Master	10	268.00	13.40	51.46
Controlled Reader	5	279.00	41.85	109.93
Tach-X	10	245.00	12.25	47.04
Audio Card Reader	5	217.00	32.55	85.50
Hoffman Machine	5	445.00	66.75	175.33
Singer Readermate	10	171.00	25.65	49.93
Vomcom	10	137.00	20.55	40.04
Timers	1	9.00	0.00	9.00
SPECIAL MATH AND OTHER INSTRUCTIONAL				
Calculator	5	36.00	1.80	10.58
System 80	5	500.00	25.00	147.00
Tutor Computer	10	1,368.00	68.40	262.57
Mathiputer	5	285.00	14.25	83.79
Telebinocular	10	382.00	19.10	73.34

maintenance were assigned an annual operating cost of 5 percent of their capital investment costs; and equipment items requiring substantial maintenance were given an annual operating cost equal to 15 percent of their capital investment costs.

Total annualized costs for equipment items were equal to the sum of the capital investment costs amortized over the life of the equipment at an annual interest rate of 7 percent plus the annual operating costs.

Materials

Three classes of materials were identified in this study: library books, textbooks, and kits. We used a 10-year depreciation schedule and a 7 percent discount rate for materials. We assumed zero maintenance costs for books and a 5 percent maintenance cost for kits. We used current kit prices; for textbooks, we used an average price based on previous cost studies.[1] Table D-3 summarizes the costs derived.

Personnel

Estimating total annual salaries for various types of personnel is much simpler in the RENP study than in other compensatory education cost analyses. This is because a single set of job classifications is in force--there is no worry that the same function at two schools is performed by personnel with different job titles. Accordingly, we used the job titles observed in our field work. The job titles and total annual compensation figures used are shown in Table D-4.

For RENP employees, each job is associated with a particular grade and salary schedule. We used the most recently computed average annual salary, including the benefits for that grade and schedule (from DCPS Budget Department information).

For other personnel except classroom teachers, we computed an average salary from the DCPS FY 78 budget. This procedure covered 95 percent of the job classifications. Salary information for health personnel (MDs, dentists) was derived from RMC's cost analysis of Follow Through projects.

1. A Cost Analysis of Follow Through Projects.

Table D-3
MATERIALS COST

Resource	Annualized Cost (dollars)
Textbooks	0.72
Library Books	0.50
Kits	18,23
Workbooks	2.42
Cuisanaire Rods	17.09

Table D-4

FULL ANNUAL SALARIES BY JOB CLASSIFICATION

Title	Cost (dollars)
RENP PERSONNEL	
Director (TSA-5)	30,473
Assistant Directors--Reading, Mathematics (TSA-8)	26,354
Assistant Director, Management (GS-12)	24,578
Parent/Community Involvement Programs Assistants--Reading, Mathematics (TSA-10)	23,843
Facilitators--Evaluation (TSA-10)	23,843
Resource Coordinator--Public Information (GS-11)	20,607
Administrative Assistant for Personnel (GS-7)	14,437
Account Clerk	
Program Assistant, Parent/Community Involvement	
Secretary to Director (GS-6)	13,532
Administrative Assistant, Parent/Community Involvement	
Office Services Supervisor (GS-5)	11,602
Community Relations Specialist	
Secretaries	
Community Organizers	
Institutional Aides (GS-4)	9,731
Receptionist (GS-3)	8,950
Machine Operator	
OTHER PERSONNEL	
Classroom Teachers	(see schedule)
Teacher Aide	9,731
Parent Volunteer	9,731
Other Volunteer	9,731
Mathematics Specialist	16,833
Reading Specialist	17,656
Librarian	17,747
Clerk/Tester	9,785
Staff Developer/Site Coordinator	22,330
Secretary	9,837
Principal	27,292
Assistant Principal	24,081
Physician	41,500
Psychologist	17,624
Psychometrist	17,844
Psychiatrist	41,500
Hearing Therapist	17,844
Dentist	41,500
Optometrist	41,500
Nurse	15,974
Dental Hygienist	15,974
Nutritionist	15,974
Attendance Officer	17,844
Other Teachers	17,312
Social Worker	17,594
Speech Therapist	17,844
Guidance Counselor	17,747
Non-Instructional Aide	9,731

For classroom teachers, we used individual annual compensation. These salaries are based on education and years of experience. The salary schedule used is shown in Table D-5.

Table D-5

CLASSROOM TEACHER SALARY SCHEDULE
(dollars)

	Years of Service													
	Less than 1	2	3	4	5	6	7	8	9	10	11	12	13	More than 14
TSA-15														
Group A, Bachelor's Degree	10,536	10,955	11,374	11,793	12,311	12,630	13,160	13,690	14,220	14,750	15,280	15,810	16,340	17,612
Group A-1, Bachelor's + 15	11,061	11,480	11,899	12,317	12,736	13,155	13,685	14,215	14,745	15,275	15,805	16,335	16,865	18,667
Group B, Bachelor's +30, MA	11,591	12,121	12,651	13,181	13.711	14,241	14,798	15,556	16,213	16,870	17,527	18,184	18,842	20,553
Group C, Master's Degree + 30	12,121	12,651	13,181	13,711	14,241	14,771	15,428	16,086	16,743	17,400	18,057	18,714	19,372	21,094
Group D, Master's + 60, Doctor's	12,651	13,181	13,711	14,241	14,771	15,301	15,958	16,616	17,273	17,950	18,587	19,244	19,902	21,783

APPENDIX E

SAMPLE AND DATA COLLECTION

SAMPLE AND DATA COLLECTION

SAMPLE

The sample was selected by the DCPS Division of Research and Evaluation. Drawn entirely from the Anacostia Project Schools, it comprised ten experimental elementary schools, an experimental junior high school, eight control elementary schools, and a control junior high school. Within each elementary school, one or more classes in grades 4 to 6 were included in the sample. The junior high classes were all from grade 8. No senior high school classes were in the sample selected. Table E-1 displays the distribution of classes by school for the control and experimental schools.

DATA COLLECTION

Five data collection guides were developed for the study. They dealt with:

- RENP reading,
- RENP mathematics,
- RENP parent/community involvement,
- RENP office/administration, and
- the schools and classrooms in the sample.

A primary interviewee was identified for each guide. It was the component director in reading and mathematics; the RENP director in parent/community involvement and office/administration (the parent/community involvement director position was vacant), and the principal in each school. In addition to the primary interview, other interviews were conducted to provide data that the primary interviewee was unable to supply

Table E-1

DISTRIBUTION OF SAMPLE CLASSES BY GRADE AND SCHOOL

Schools	Grades				
	4	5	6	7	8
EXPERIMENTAL					
Birney	1				
Congress Heights		2	1		
Draper	1	1			
Friendship			1		
Green	1		1		
Hart					9[a]
Hendley		2			
Leckie	2				
Malcolm X		1			
Savoy			1		
Simon		1	1		
Subtotal	5	7	5		9
CONTROL					
Johnson					6
Ketcham	1				
McGogney			1		
Moten	3	1	2		
Patterson	1				
Randle Highlands	1	1	1		
Stanton			1		
Turner		1			
Washington Highlands			2		
Subtotal	6	3	7		6

a. Only six homerooms were used.

accurately. When costing the reading and mathematics components, RMC field workers visited the laboratories and spoke with facilitators and aides. At the schools, RMC often interviewed classroom teachers. At RENP, information was supplied by many people.

In addition to the data collected through RMC's interviews, a great deal of information was compiled from other sources. This information included budgetary, contractual, and expenditure data from NIE, many analyses conducted by the DCPS Division of Research and Evaluation, and a great deal of budgetary data from the DCPS Budgetary Department. Finally, RENP supplied many past quarterly reports, as well as current expenditure, inventory, and budgetary information.

Nonresponse was not a significant problem in this study. In general, RMC interviewers received excellent cooperation from the primary and secondary interviewees. There were, however, isolated problems:

- One control elementary school principal would not cooperate--no data from that school has been used in this analysis. It poses no apparent problem to our analysis.

- There were several instances of item nonresponse. The most significant type occurred when an interview in the school was conducted with the principal, but information regarding one or more sample classroom teachers was not provided. We observed no apparent pattern to this nonresponse, except that homeroom teacher information was not available for any of the sample teachers in the control junior high. We adjusted for this factor in our comparison of teacher salaries by not considering experimental teacher salaries in the average. Overall, we received classroom teacher information on 88 percent of the experimental teachers and 68 percent of the control teachers. Excluding the control junior high teachers, we received 94 percent of the control teacher information sought.